

## REMARKS

In the Office action dated July 21, 2003, claims 1 – 6, 8, 15 – 19, and 24 – 26 were rejected and claims 7, 9 – 14, and 20 – 23 were objected to. In response, claims 1 and 9 have been amended, claims 27 – 31 have been added and claims 15 – 26 have been canceled. Applicants hereby request reconsideration of the application in view of the amended claims, the new claims, and the below-provided remarks.

### I. Claim Rejections under 35 U.S.C. 112

Claim 9 was rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Regarding claim 9, the Office action states:

“the phrases ‘wherein said plurality of EH gratings are included within a chirped grating’ and ‘passing an optical signal through a series of EH gratings with different center wavelengths includes passing said optical signal through a chirped EH grating’ are unclear since Figure 7 of the disclosure shows that the EH gratings are combined into a single electroholographic filter element (EFE) so that in fact the chirped grating is the EFE which is a series or concatenation of EH gratings as opposed to the current recitation which appears to claim a separate element (i.e., chirped grating) from the EH gratings.”

#### Claim 9

Claim 9 has been amended to recite “wherein said plurality of EH gratings are formed as a chirped EH grating that can be activated at different center wavelengths by applying different voltages across said chirped EH grating.” (amendment additions being identified with underlining)

Support for this amendment is found at paragraph [0058] and Fig. 7. Applicants assert that amended claim 9 particularly points out and distinctly claims the subject matter which Applicants regard as the invention.

### II. Claim Objections

Claims 24 – 26 were objected to. Claims 24 – 26 have been canceled.

### III. Claim Rejections Under 35 U.S.C. 102

Claims 1 – 6, 8, and 15 – 19 were rejected under 35 U.S.C. 102(b) as being anticipated by De Vre et al. (U.S. Pat. No. 5,640,256, hereinafter De Vre).

#### Claims 1

Claim 1 has been amended to recite a tunable optical filter comprising:

“a plurality of electroholographic (EH) gratings, said EH gratings being optically connected such that an input optical signal can pass through at least one of said plurality of EH gratings, wherein said EH gratings are activated to filter said input optical signal in response to an applied voltage, said plurality of EH gratings including EH gratings with different center wavelengths and EH gratings with the same center wavelengths.”

In particular, the amendment removes the phrase “with different center wavelengths” and adds the phrase “said plurality of EH gratings including EH gratings with different center wavelengths and EH gratings with the same center wavelengths.” Applicants assert that amended claim 1 is not anticipated by De Vre because De Vre does not disclose “said plurality of EH gratings including EH gratings with different center wavelengths and EH gratings with the same center wavelengths” as recited in amended claim 1. Specifically, De Vre does not disclose EH gratings that have the same center wavelengths. Rather, De Vre discloses a multiple wavelength filter with EH gratings that each have different center wavelengths. For example, Fig. 8 of De Vre depicts EH gratings having center wavelengths of  $\lambda_B^1$ ,  $\lambda_B^2$ ,  $\lambda_B^3$ , and  $\lambda_B^4$  all of which are different (see col. 8, lines 26 – 30). Figs. 11 and 12 of De Vre further depict that all of the EH gratings in the multiple wavelength filter have different center wavelengths. Specifically, EH gratings 52A, 52B, and 52C have center wavelengths  $\lambda_B^1$ ,  $\lambda_B^2$ , and  $\lambda_B^3$ , respectively. Because De Vre does not disclose “said plurality of EH gratings including EH gratings with different center wavelengths and EH gratings with the same center wavelengths” as recited in amended claim 1, Applicants assert that amended claim 1 is not anticipated by De Vre.

Claim 2

Claim 2 is dependent on amended claim 1. Applicants assert that claim 2 is allowable based on an allowable claim 1.

Claim 3

Claim 3 recites "wherein EH gratings of the same center wavelength are controlled simultaneously by said voltage controller." Regarding the limitations of claim 3, the Office action states that "De Vre et al discloses that the EH gratings of the same center wavelength are controlled simultaneously by said voltage controller as described in column 2, lines 54 – 57, column 8, lines 60 – 67, column 9, lines 1 – 67 and column 10, lines 1 – 16 and column 12, lines 4 – 63 and as shown in Figures 7, 8, 13, and 14."

Applicants assert that claim 3 is not anticipated by De Vre because De Vre does not disclose "wherein EH gratings of the same center wavelength are controlled simultaneously by said voltage controller" (emphasis added) as recited in claim 3. Specifically, De Vre does not disclose EH gratings that have the same center wavelengths. Rather, De Vre discloses a multiple wavelength filter with EH gratings that each have different center wavelengths. For example, Fig. 8 of De Vre depicts EH gratings having center wavelengths of  $\lambda_B^1$ ,  $\lambda_B^2$ ,  $\lambda_B^3$ , and  $\lambda_B^4$  all of which are different (see col. 8, lines 26 – 30). Figs. 11 and 12 of De Vre further depict that all of the EH gratings in the multiple wavelength filter have different center wavelengths. Specifically, EH gratings 52A, 52B, and 52C have center wavelengths  $\lambda_B^1$ ,  $\lambda_B^2$ , and  $\lambda_B^3$ , respectively.

De Vre does disclose that EH gratings having different center wavelengths can be simultaneously activated as depicted in Figs. 11 and 12. For example, EH gratings 52A and 52B are simultaneously activated. Although De Vre discloses the simultaneous activation of EH gratings that have different center wavelengths, De Vre does not disclose "wherein EH gratings of the same center wavelength are controlled simultaneously by said voltage controller" as recited in claim 3. Because De Vre does not disclose "wherein EH gratings of the same center wavelength are controlled simultaneously by said voltage controller" as recited in claim 3, Applicants assert that claim 3 is not anticipated by De Vre.

Claims 4 – 14

Claims 4 – 14 are dependent on amended claim 1. Applicants assert that claims 4 – 14 are allowable based on an allowable claim. Remarks relevant to claims 4 and 5 are provided below with regard to new claims 27 and 28.

Claims 15 – 26

Claims 14 – 26 have been canceled. Applicants assert that this decision is made without prejudice to the validity of the claim.

New claim 27 (claims 1 + 4 as filed)

New claim 27 is formed by combining the limitations of claims 1 and 4 as filed. New claim 27 recites a tunable optical filter comprising:

“a plurality of electroholographic (EH) gratings with different center wavelengths, said EH gratings being optically connected such that an input optical signal can pass through at least one of said plurality of EH gratings, wherein said EH gratings are activated to filter said input optical signal in response to an applied voltage;

wherein said EH gratings are tunable over a range of wavelengths in response to adjustments in the applied voltage.”

Claim 4, as filed, recites “wherein said EH gratings are tunable over a range of wavelengths in response to adjustments in the applied voltage.” With regard to claim 4 as filed, the Office action states “De Vre et al discloses that said EH gratings are tunable over a range of wavelengths in response to adjustments in the applied voltage as described in column 8, lines 60 – 67, column 9, lines 1 – 67 and column 10, lines 1 – 16 and column 12, lines 4 – 63.”

Applicants assert that new claim 27 is not anticipated by De Vre because De Vre does not disclose EH gratings that are “tunable over a range of wavelengths in response to adjustments in the applied voltage.” The EH gratings disclosed by De Vre are turned “on” or “off” to filter light of a particular wavelength. For example, Figs. 11 and 12 of De Vre depict a multiple wavelength filter 50 having three EH gratings, 52A, 52B, and 52C with different center wavelengths. The multiple wavelength filter is shown in state A and state B. In state A, EH grating 52B is “on” and EH gratings 52A and 52C are “off.” In state B, EH gratings 52A and 52B are “on” and EH grating 52C is “off.” As

shown in Fig. 12, a corresponding wavelength of light is filtered when the respective EH grating is "on" and no light is filtered when an EH grating is "off." Further, De Vre discloses at col. 10, lines 6 – 8 that "the electronic fields can be used to selectively turn grating layers 12 on and off." At col. 12, lines 34 – 36, De Vre discloses "In FIG. 14 a control unit 92 applies voltages via leads 94 and 96 to pairs of electric contacts 76 to turn the corresponding grating layers 78 on and off." Additionally, as shown in Fig. 12, the center wavelengths of the EH gratings are fixed at the wavelengths  $\lambda_B^1$ ,  $\lambda_B^2$ , and  $\lambda_B^3$  with the only variable being whether the EH grating is turned "on" or "off." As shown by these passages, De Vre discloses a system in which EH gratings are turned either "on" or "off." Nowhere does De Vre disclose EH gratings that are "tunable over a range of wavelengths in response to adjustments in the applied voltage" as recited in claim 4.

De Vre does disclose that the diffraction efficiency of each EH grating can be varied (col. 3, lines 23 – 37). Specifically, at col. 3, lines 25 – 28, De Vre discloses that "the diffraction efficiency control is set up to vary the diffraction efficiency  $\eta$  in each grating layer  $i$  from a minimum value, e.g., almost 0%, to a maximum value, e.g., around 100% in an optimized filter." While De Vre does disclose varying the diffraction efficiency of an EH grating, De Vre does not disclose "wherein said EH gratings are tunable over a range of wavelengths in response to adjustments in the applied voltage" as recited in new claim 27. Because De Vre does not disclose "wherein said EH gratings are tunable over a range of wavelengths in response to adjustments in the applied voltage" as recited in new claim 27, Applicants assert that new claim 27 is not anticipated by De Vre.

The above-provided remarks apply also to claim 4.

New Claim 28 (claims 1 + 5 as filed)

New claim 28 is dependent on new claim 27. New claim 28 is the same as claim 5 and recites "wherein the tunable wavelength ranges of said EH gratings combine to form a continuously tunable wavelength range." With regard to claim 5, the Office action states "De Vre et al discloses that the tunable wavelength ranges of said EH gratings combine to form a continuously tunable wavelength range as described in column 8, lines 60 – 67, column 9, lines 1 – 67 and column 10, lines 1 – 16 and column 12, lines 4 – 63."

Applicants assert that new claim 28 is not anticipated by De Vre because De Vre does not disclose tunable wavelength ranges of EH gratings that "combine to form a continuously tunable wavelength range." As stated above, De Vre discloses EH gratings having different center wavelengths (see col. 8, lines 26 – 30). The EH gratings having the different center wavelengths are then turned "on" or "off" to filter an optical signal. The wavelength bands that are filtered by the activated EH gratings are separate and distinct from each other and do not form a continuously tunable wavelength range. Fig. 12 of De Vre clearly shows that specific non-continuous wavelength bands are filtered using the disclosed multiple wavelength filter. Nowhere does De Vre disclose "wherein the tunable wavelength ranges of said EH gratings combine to form a continuously tunable wavelength range" as recited in new claim 28. Because De Vre does not disclose "wherein the tunable wavelength ranges of said EH gratings combine to form a continuously tunable wavelength range" as recited in new claim 28, Applicants assert that new claim 28 is not anticipated by De Vre.

The above-provided remarks apply also to claim 5.

#### IV. Allowable Subject Matter

Claims 7, 9, 10 – 14, and 20 – 23 were objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

##### New claim 29 (claims 1 + 7)

Claim 7, as filed, was dependent on independent claim 1 as filed. Applicants have added new claim 29, which includes the limitations of claims 1 and 7, as filed. Applicants assert that new claim 29 is in an allowable condition.

##### New claim 30 (claims 1 + 9)

Claim 9, as filed, was dependent on independent claim 1 as filed. Applicants have added new claim 30, which includes all of the limitations of claims 1 (as filed) and claim 9 (with the amendments described above). Applicants assert that new claim 30 is in an allowable condition.

New claim 31 (claims 1 + 14)

Claim 14, as filed, was dependent on independent claim 1 as filed.

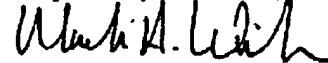
Applicants have added new claim 31, which includes the limitations of claims 1 and 14, as filed. In new claim 31, the limitations of claim 1 were modified by removing the phrase "with different center wavelengths" and adding the phrase "said plurality of EH gratings including EH gratings with different center wavelengths and EH gratings with the same center wavelengths." Applicants assert that new claim 31 is in an allowable condition.

V. Objection to the Specification

The disclosure was objected to because there was no description provided for Figure 9 of the drawings in the section titled "Brief Description of the Drawings." Applicant has added paragraph [0033.1] to describe Figure 9. Support for the added paragraph is found in paragraph [0063] of the specification as filed.

Applicants respectfully request reconsideration of the claims in view of the remarks made herein. A notice of allowance is earnestly solicited.

Respectfully submitted,



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